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An improved pinhole spatial filter

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Lasers generate phase aberrated light that can damage laser glass, frequency conversion crystals, lenses and mirror coatings and can also reduce extractable energy and power. Spatial pinhole filters[1,2] can partly eliminate such "hot spots." Problems are that the pinhole closes during the laser pulse and has to be made too large initially to avoid being too small at

the end of the pulse. Debris from the pinhole can damage spatial filter lenses. This paper presents a novel design for a more robust pinhole filter. Phase distorted (hot spot) light is refracted at grazing incidence by plasma on the wall of a funnel shaped filter resulting in less absorption and debris.

Refracted light is dumped at low intensities on the vacuum wall. We present two dimensional hydrodynamic computer simulations compare the two types of filters with experimental comparison. We present simulations of NIF spatial filters.

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References

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